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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 21

Application Number: 09/578,108
Filing Date: May 24, 2000
Appellant(s): KAZMER ET AL.

Faustino A. Lichauco
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed March 04, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences, which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct, except the rejection of claims 1-39 under 35 U.S.C. 112 second paragraph and double-patenting rejection have been removed.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is not correct. At a personal interview and demonstration on November 18, 2003, Appellant clearly demonstrated the invention as in fig. 14. The Examiner, the supervisory and the Primary examiner proposed that an amendment would place the claims in condition for allowance if the Appellant explicitly specifies the claim language corresponding to the invention as shown in fig. 14. Not only the proposed amendment does not place the claims in condition for allowance, but also raised new issues by changing a word from singular to plural (a relationship, variable and attribute changed to relationships, variables and attributes respectively).

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct, except the rejection of claims 1-39 under 35 U.S.C. 112 second paragraph and double-patenting rejection have been removed.

(7) Grouping of Claims

Claims 1-39 stand or fall together.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,287,284	Sugino et al.	2-1994
6,289,299 B1	Daniel, Jr. et al.	9-2001

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-39 rejected under 35 U.S.C. 103(a). This rejection is set forth in prior Office Action, Paper No. 11.

(11) Response to Argument

The summary of the reference Sugino invention: (see cols. 1 and 2, lines 5-13, 60-67; 1-41 respectively) The invention relates to a product specification complex analysis system which obtains optimum product specification values when product specifications are designed, by collectively analyzing (equivalent to Appellant's design-interface) and evaluating the design specifications (equivalent to Appellant's performance graph) from a plurality of aspects such as the aspect of reliability during use of products, the aspect of processability, the aspect of operability, and so forth (equivalent to Appellant's control graph and decision variables).

It is therefore the first object of the Sugino's invention to provide a product specification complex analysis system which can decide product specification values to optimum values by collective judgment based on analysis results obtained from two or more different aspects. And to provide a product specification complex analysis system, which can decide product specification values to optimum values by collective judgment based on analysis results, obtained at least from the aspect of reliability of product specifications, the aspect of processability during production and operability during production. A product specification complex analysis system which can decide product specification values to optimum values by flexible and collective judgment based on analysis results obtained from two or more different kinds of aspects when complex analysis is carried out. A product specification complex analysis system which can decide product specification values to optimum values even when analysis result or results cannot be obtained for certain items of estimates by the analysis system of its own.

- Appellant in third paragraph on page 14 argues that according to the present Examiners, Sugino teaches every element of the claimed invention with the exception of the "design-interface".

Examiner reply: According to the Examiner the above statement is incorrect, however, Sugino teaches the design-interface by collectively analyzing and evaluating the design specifications from a plurality of aspects such as the aspect of reliability during use of products, the aspect of processability, the aspect of operability, and so forth. (See Sugino at col. 1, line 9).

- Appellant in forth paragraph on page 14 argues that is not clear from the office actions which graphs in Sugino the Examiner considers to correspond to decision, performance and control graphs.

Examiner's reply: a brief summary of the Appellant's invention is to provide a graphical display to assist a system designer in the solution of multivariate optimization problems. Refer to Appellant's specification on page 2, last paragraph lines 3-4 of the amendment filed on December 17, 2002 discloses the first critical step is to find these extreme points.

The decision graph of the Appellant corresponds to the result of analysis in Sugino, as shown in figs. 4 to 6, the contents of the result of analysis are the stress on the upper/lower side of the chip pad, which is one of the design parameters and changes with the chip pad position, the chip pad, the stress during reflow soldering, and so forth. Also Sugino in col. 7 lines 10-34 teaches that in particular, fig. 4A is a schematic view of the section of the plastic-encapsulated package of the semiconductor device, and in figs. 4B to 4D show the upper/lower stress distribution acting on the chip pad (or the chip) during molding at three points in time series with the top of flow when flow analysis (simulation) is carried out. The chip pad shown in fig. 5 is obtained by effecting strength analysis from the stress on the upper/lower side of the chip pad shown in fig. 4. In the drawing, the chip pad position on the abscissa represents the chip pad height and is expressed by x=d/D (d: constant) shown in fig. 4A. As can be understood from fig. 5, the chip pad receives at the time of flow of the resin changes in accordance with the chip pad position h but when d=D/2, it can be understood that the chip pad is limited to the minimum value. Furthermore, in fig. 6 shows the chip pad stress during reflow soldering between the chip pad and the resin in accordance with the chip pad position x (the mean value of the stress at the

corners which are regarded important in stress analysis during reflow soldering as the positions on which the stress concentrates). For simplicity, a person skilled in the art could interpret the first/second/... design variables of Appellant corresponds to variation in chip pad length (l), the distance of chip pad from lower/upper side (d) and the chip pad height (x) of Sugino in fig. 4A. The critical point parameters will lead the designer to the best design configuration in Sugino.

The performance graph corresponds to the result display processing unit 30 on the display device 16 together with a graph representing the design parameter change of the evaluation value obtained by the trade-off evaluation unit 28, as shown in fig. 10 two performance graphs from design variables f1 and f2 verse x (i.e. equal d/D), (processing 128 in fig. 1B). A user can manipulate the design variables f1, f2 and x to control the resulted performances. Sugino in cols. 7 and 8 lines 63-67 and 1-2 teaches in the trade-off evaluation unit 28 normalization is executed from the analysis result obtained by calculating the polynomials so that the analysis result falls within the range of a specific value. For example, conversion is made so that the best case corresponds to "1" and the worst case, to "0" and normalization is made so that the analysis result falls within the range of [0, 1] (processing 122).

The control graphs correspond again to fig. 10 in Sugino. In order to produce different package structure shown in fig. 10, the user can manipulate the design variables f1, f2 and x to control the resulted performances attribute shown clearly in fig. 10 the processes can be referred as a first category which involve design variables, control/performance/decision graphs or extreme points in x and y coordinates, then in second category the design optimum shows different structures resulted from the process sections, the third category is involved attributes (the

optimum and evaluation values), and so fort. A person skilled in the art would easily identify the effectiveness of the design variables over the outcome of the system in fig. 10.

- Appellant in fifth paragraph on page 14 argues that there is no indication anywhere in Sugino that these graphs are anything but illustrative drawings intended to assist the reader in understanding the subject matter of the Sugino invention.

Examiner's reply: Sugino in col. 6 lines 1-13 teaches that the product specification complex analysis system in accordance with the invention will be explained about the case where it is applied to the design of a plastic-encapsulated package of a semiconductor device, by way of example, and its processing flow is shown in figs. 1A, 1B and 1C; and figs. 4-7. Incidentally, this embodiment assumes the case where the position design of chip pads (metal plates for supporting a chip) of the plastic-encapsulated package of a semiconductor device is carried out from the aspect of reliability during reflow soldering at the time of PCM (Printed Circuit Board) mounting and from the aspect of moldability during a molding process.

- Appellant in sixth paragraph on page 14 argues that is unclear what graphs in Sugino correspond to each of the graph types in claim 1.

Examiner's reply: Contrary, it is very clear to a person skilled in the art to association between graphs in Sugino and the language that Appellant uses in claim 1 such as "decision variables" and "performance attributes". Fig. 4A of Sugino shows a chip pad position parameters as length of chip pad shown by a "l", distance from chip pad position to lower boundary level shown by a "d", and the size of the inlet shown by a "D". These parameters from judgment of a person skilled in the art consider as decision variables or decision parameters which can be controlled the performance attributes as shown in figs. 4B-4D. Based on the process of changing the

quantity of variables "l" and "x" the result would be illustrated the chip pad position in lower/upper stress (that is the same as Appellant claim language "performance attributes/graphs").

- Appellant in forth paragraph on page 15 argues that the fig. 5 of Sugino has one axis that is a design variable and one axis that is a performance attribute, it can be none other than a "control graph" within the meaning of claim 1.

Examiner's reply: Appellant refers to claim 1 language lines 7-9 on page 20 of specification that claimed " a plurality of control graphs generated on said display using said output of said processor, at least one of said control graphs illustrating an effect of a first design variable on a first performance attribute;" Sugino, in fig. 5 illustrates the design variables and the performance attributes on two axes (y and x), and the control graph can also be represented by the hyperbolic graph that passes through three different conditions of chip pad. In fig. 7 Sugino teaches a plurality of control graphs under polynominalization.

- Appellant in fifth paragraph on page 15 argues according to claim 1, a "decision graph" would have to have both axes corresponding to "design variables". In fig. 5, only one axis (chip pad position) corresponds to a design variable. The other "chip pad" corresponds to a performance attribute. The claim language is as following: "a plurality of decision graphs generated on said display using said output of said processor, at least one of said decision graphs showing a relationship between said first design variable and a second design variable".

Examiner's reply: Sugino in fig. 5 illustrates both axes corresponding to first design variable and second design variable. The chip pad has a variable length of "l" ("l" can be considered as an

equivalent to first design variable) as mentioned previously. The chip pad position varies according to distances of "x" can be considered as an equivalent to second design variable) as mentioned previously.

- Appellant in sixth paragraph on page 15 argues a repeated argument.
- Appellant in first paragraph on page 16 argues that fig. 6 is another graph in Sugino, just like fig. 5. It cannot be considered a decision graph or a performance graph.

Examiner's reply: The scenario is very simple and effective in fig. 6. Sugino illustrates two type of graphs, one is on X and Y coordinate that can be controlled by changing the length of chip pad "l" and different size of "x". Therefore by changing the values of "l", "x" one can control the graph and simultaneously observe the performance graph in different conditions (three rectangular graphs). Reminder: X and Y coordinate both considered also as performance attributes, for example for the graph in fig. 6 the performance attributes are "l", "x". Now the two axes have the performance attribute "l" vs the performance attributes ("x"). The concept of Sugino's invention is similar to Appellant's invention.

- Appellant in third paragraph on page 16 argues that fig. 7 shows only control graphs.

Examiner's reply: Appellant is keep repeating the arguments. In fig. 7 Sugino illustrates a plurality of graphs that discussed previously. In fig. 7 a processor (not shown) having disc step 18 that contains program instructions that displays visually the performance of different situations in chip pad positions. The performance graph shown on top of the polynominalization section and the performance attributes and control graphs and decision variables shown under the polynominalization. The graph shown under normalization can be considered as decision graphs, because the normalization is the same as calibration of the system. And also in fig. 7

conversion is made so that the best case corresponds to "1" and the worst case, to "0" and normalization is made so that the analysis result falls within the range of [0, 1] (processing 122 see fig. 1B).

- Appellant in last paragraph under fig. 8 on page 16 argues that fig. 8 shows graphs that are like those discussed in fig. 7. The central portion of fig. 8 shows a graph representative of data stored in a database. It seems unclear to Appellant the description what type of graph that is.

Examiner's reply: Since Sugino's invention relates to a product specification complex analysis system which obtains optimum product specification values when product specifications are designed, by collectively analyzing and evaluating the design specifications from a plurality of aspects such as the aspect of reliability during use of products, the aspect of processability, the aspect of operability. The system requires normalization (calibration) every time the process of stress and balance analysis run. In fig. 8 the data are inputting into normalization section from stress and balance analysis, and the same time the data outputted from normalization into the reference function and can be displayed after evaluation is done (see the formulation).

- Appellant in second paragraph on page 17 describes the fig. 9 in Sugino.

Examiner's reply: is a diagram showing a conversion example of normalization processing.

- Appellant in forth paragraph on page 17 describes the figs. 4A-4D.

Examiner's reply: repeated argument.

Sugino's invention has similar concept as Appellant's invention, however Sugino teaches all elements in claim 1 language, the merely differences are the terminology of the claim language.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5-8, 11, 14-21, 24, 27-34 and 37 rejected under 35 U.S.C. 103(a) as being unpatentable over Sugino US patent 5,287,284 with filling date of 11/14/1991.

1. Claims 1, 14, 27

As per claim 1, Sugino demonstrated all the elements in Fig. 2 and 3 the data processing unit number 21 and the display device number 16. As for "a processor having an input for accepting instructions and an output for driving a visual display". Sugino demonstrated all the elements in Fig. 10 that the optimum value of the design parameter is displayed by the result display-processing unit 30 on the display device 16 together with a graph representing the design parameter change of the evaluation value obtained by the trade-off evaluation unit 28. As for "a plurality of control graphs generated on said display using said output of said processor, at least one of said control graphs illustrating an effect of a first design variable on a first performance attribute". Sugino, in fig. 5 illustrates the design variables and the performance attributes on two axes (y and x), and the control graph can also be represented by the hyperbolic graph that passes through three different conditions of chip pad. In fig. 7 Sugino teaches a plurality of control graphs under polynominalization. As for "a plurality of performance graphs generated on said display using said output of said processor, at least one of said performance graphs showing a

relationship between said first performance attribute and a second performance attribute". Sugino in fig. 6. illustrates two type of graphs, one is on X and Y coordinate that can be controlled by changing the length of chip pad "l" and different size of "d" and "D". Therefore by changing the values of "l", "d" and "D" one can control the graph and simultaneously observe the performance graph in different conditions (three rectangular graphs). Reminder: X and Y coordinate both considered also as performance attributes, for example for the graph in fig. 6 the performance attributes are "l", "d" and "D". Now the two axes have the performance attribute "l" vs the performance attributes ("d" and "D"). The concept of Sugino's invention is similar to Appellant's invention. As for "a plurality of decision graphs generated on said display using said output of said processor, at least one of said decision graphs showing a relationship between said first design variable and a second design variable". The decision graph corresponds to fig. 1B steps 126, 128, 130 and 132 will be displayed optimization result on device 16 by result display unit 30 in fig. 3. As for " a design-interface coupled to said input of said processor, said design-interface enabling a user to manipulate said first design variable to control said first performance attribute". Sugino teaches the design-interface by collectively analyzing (see Sugino at col. 1, line 9). These steps are obvious because most of systems have processors and display, and compatibility or the common use of a database has been accomplished so as to carry out a plurality of analyses as a series of analyses, but evaluation of each analysis result is entirely left to the judgment of users.

2. Claims 2, 15, 28

Sugino demonstrated all the elements in (col. 8 line 45-50) that the optimum value of the design parameter is displayed by the result display processing unit 30 on the display device 16 together

with a graph representing the design parameter change of the evaluation value obtained by the trade-off evaluation unit 28, as shown in Fig. 10.

As for "The computer-implemented display system of claim 1 wherein said design-interface is a graphical user-interface". The step is obvious because Specific analysis or analyses are conducted with a high level of accuracy (to yield accurate calculation results for an assumed model) and the analysis results are merely displayed graphically.

3. Claims 3, 16-17,29-30

Sugino illustrated in Fig. 7 to change parameters for example "weights" using the user-adjustable slider and values of design variables change in response to movement of slider.

As for "The computer-implemented display system of claim 2 wherein said graphical user-interface comprises a scroll-bar having a user-adjustable slider and a value of said first design variable changes in response to movement of said adjustable slider".

The step is obvious because in order to experience the best results out of the model analysis the programs should include tools bar to make it easier for user interface.

4. Claims 5, 18,21, 24,31,34, 37

Sugino demonstrated all the elements in Fig. 13A, 13C number 202 and122 convert and normalize analysis results approximated by polynomials probability distribution.

As for "The computer-implemented display system of claim 1 wherein said first design variable is a random variable and said design-interface enables a designer to specify a probability distribution of said first design variable". The step is obvious because in order to experience the best result, first the system will start with random or estimated variables until the user find the correct range of values from first design variable.

5. Claims 6, 19, 32

Sugino demonstrated all the elements in (Col. 6 line 44-54) that the analysis execution controller 24 changes the chip pad position as one of the design parameters (processing 110) and if the chip pad position after this change is within the change range of the chip pad position as the allowable design range of the chip pad position to be in advance inputted to the system (processing 112), the analysis program is executed once again while data other than the chip pad position data are regarded as being the same, and the analysis result as the execution result is stored in the disc device 18 by the analysis result storage controller 26.

As for "The computer-implemented display system of claim 1 further comprising a specification interface coupled to said plurality of performance graphs, said specification interface enabling a designer to specify a range of permissible values for said first performance attribute".

The step is obvious because in order to experience the best result, first the system will start with random or estimated variables until the user find the correct range of values from first design variable that is a range of permissible values.

6. Claims 7, 20, 33

Sugino demonstrated all the elements in Fig. 7 and Fig. 1C number 302.

As for "wherein said specification interface further comprises a designer-preference interface for enabling a designer to assign a weight to said first performance attribute, thereby indicating an importance of said first performance attribute relative to said second performance attribute". The step is obvious because the second performance attribute has different values (weight coefficients) than is a first performance attribute.

7. Claim 8,

Sugino demonstrated all the elements in Fig. 13A number 202 analysis by group of analysis programs managed from items of estimates by program storage controller. Also in Fig. 13C number 122 demonstrated all the elements that to convert and normalize analysis results approximated by polynomials probability distribution.

As for "The computer-implemented display system of claim 6 wherein said first performance attribute is a random variable and said specification-interface enables a user to specify a probability distribution associated with said first performance attribute". The step is obvious because in order to experience the best result, first the system will start with random or estimated variables until the user find the correct range of values from first design variable.

8. Claim 11,

Sugino illustrated in Fig. 5 and 6 that control graph display indicates of allowable values of the design variable. As for "The computer-implemented display system of claim 1 wherein said at least one control graph displays an indication of allowable values of said first design variable". The step is obvious because in order to experience the best result, first the system will start with random or estimated variables until the user find the correct range of values from first design variable that is a range of permissible values.

Claims 4, 9-10, 12-13, 22-23, 25-26, 35-36 and 38-39 rejected under 35 U.S.C. 103(a) as being unpatentable over Sugino US patent 5,287,284, and further in view of Daniel US patent 6,289,299 B1.

9. Claim 4,

Sugino illustrated in Fig. 1A that data can be enter into system from designated areas. It is noted that Sugino dose not explicitly disclose a field area, however, this is known in the art as taught by Daniel. Daniel discloses a method to create a unique Graphic User Interface or may be integrated with existing GUI's (col. 28, line 55-60). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Daniel into Sugino because Sugino discloses a graphical method to display the out come of the system and Daniel discloses a method to create a unique Graphic User Interface that is a field area for entering data by users.

10. Claims 9, 10, 22-23, 35-36

Sugino demonstrated all the elements in Fig. 8 that plurality of control graphs is disposed in an array. It is noted that Sugino dose not explicitly specify the array is a rectangular array of rows and columns, however, this is known in the art as taught by Daniel. Daniel discloses a method to define a matrix that contains rows and columns and it is a rectangular shape (col. 10, line 65-68).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Daniel into Sugino because Sugino discloses a graphical method to display the out come of array data and Daniel discloses a rectangular shape with rows and columns that indicates variables in column and attributes in row.

11. Claims 12, 13, 25-26, 38-39

Sugino demonstrated all the elements in Fig. 7 and 8 that performance graph shows a region of permissible values for numbers of performance attributes. It is noted that Sugino dose not

explicitly specify the outer boundaries, however, this is known in the art as taught by Daniel. Daniel illustrated in Fig. 22 the outer region has limitations or boundary conditions. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Daniel into Sugino because Sugino discloses a graphical method to display the characteristics of the model or system and Daniel discloses a method of implementing boundary conditions for the model or the design.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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